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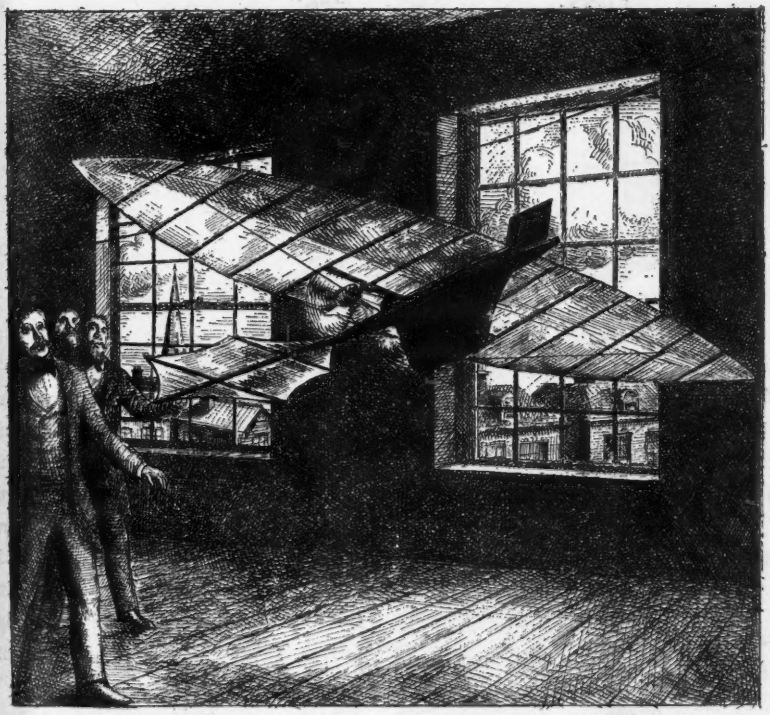

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THE JOURNAL OF SEEING AND ILLUMINATION

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CONTENTS

	Page
Editorial Notes ...	165
Notes and News ...	166
Office Lighting and Decoration	168
Fluorescent Stage Lighting	169
B.E.P. Convention ...	171
Lighting at Beverley Minster...	174
The Head Offices of the Rotterdam Bank ...	176
New Lighting Installations	183
Reviews of Books ...	187
Lighting Fittings	188
The Editor Replies ...	190

Summerlight

THE late Dr. R. J. Lythgoe, whose work on illumination and visual acuity is one of the "world classics" to knowledgeable lighting people, once remarked how curious it is that so many people who love thousands of foot candles on their holidays seem to think most meagre values of illumination are adequate for work. The advent of the holiday season recalls this saying to us, for in summer, whether or not lighting is our "business," our thoughts lightly turn to natural light, and plenty of it! How widely is it known that, even at sunrise and sunset, the illumination outdoors is much higher than it is in the great majority of rooms where people work by artificial lighting? And, even when light stops play outdoors, there is more of it than some people have for their work! Fortunately for us," Nature has fashioned our eyes to profit by her effulgence and make-do with her noctilucence."

Illumination Notes and News

Training Technologists

A report on the education and training of technologists has just been issued by a study group set up by the Federation of British Industries and though it makes another addition to the list of somewhat similar reports (e.g., the Percy Report, 1945; the Barlow Report, 1946; the Report of the Institute of Physics and the Education and Training of Technologists) which have been issued during recent years, it will be of interest to those who appreciate the seriousness of this question and it contains some useful recommendations.

The report recalls that an earlier report by the F.B.I. has already shown that there has been a healthy and substantial increase in the volume of research carried out by and for industry which is today only limited by the number of qualified scientists available and by the building and other facilities necessary for their work. It is emphasised that in the short term, industry and the community have more to gain by the application of what is already known than by the discovery of new knowledge. Knowledge, whether new or old, required technologists to apply it to industry, technologists being scientits who have studied the application of the results of scientific knowledge and discovery to industry and the arts. Technologists of the highest grade, including professional engineers, are almost invariably men who have received a sound basic training in the fundamental sciences common to all scientists.

One of the recommendations which we feel sure will be welcomed is more a matter of general education though one which has only too frequently been overlooked in the past. It is that greater attention should be devoted at school and college to the development of the capacity for lucid exposition in the written and spoken word and that in all scientific courses and examinations greater weight be given to this than has been the practice in the past.

The Study Group say—"We are satisfied that one of the handicaps in the rapid application of knowledge to the industry is the frequent failure of the scientist and technologist to express his results and other relevant technical information in language comprehensible to the non-scientific mind. We believe this to be partly a result of premature specialisation in scientific subjects while the student is still at school and before he has acquired an adequate general educational background. Much greater emphasis should be placed on English as a subject of related study in all lectures at the universities. To ensure this, university entrance scholarship examinations should require a high standard of expression both in the written and (in viva voce examinations) the spoken word.

"We would commend to the science faculties of the universities the desirability of courses in the presentation of technical information similar

to those inaugurated at University College, and courses in economics and social sciences such as have been introduced for Imperial College students.

We most certainly agree that the standard of presentation of technical information amongst technical men is far from what it should be. As regards premature specialisation we recall that Dr. Walsh in his Presidential address to the I.E.S. a year or two ago said, "It cannot be too strongly emphasised that early specialisation in illuminating engineering, before a really adequate background in all the basic subjects has been obtained, can only lead to difficulties at a later stage and should be most severely discouraged."

One part of the report deals with the responsibility of industry in the education and training of its technologists in which it has an important interest. An inescapable responsibility, it says, falls upon each industry to consider the supply and quality of technologists it requires. All industries where they have not already done so should determine the total number of technologists they require and collaborate with the appropriate educational authorities and governing bodies of colleges in the provision of adequate educational and training facilities, where these do not at present exist. Individual industries, both private and nationalised, and firms should give serious consideration as to whether they are granting adequate day release (up to 1½ days per week) for studies to those apprentices and others who are combining education with training. Industrial personnel, technical and executive, should be encouraged to give part-time service as lecturers and instructors in local Technical Colleges. Where this can be done it is invaluable in providing the practical authoritative instruction required.

G.E.C. *Research*

One of the most interesting events during the past month was the "Conversazione" held at the Research Laboratories of the General Electric Company at Wembley on the afternoons of June 21, 22 and 23. On these days the laboratories were open to representatives of all branches of industry and scientists and technologists from Universities and other research establishments who were able to see, as nearly as was possible with the influx of visitors, the laboratories under normal working conditions.

A visit such as this can serve only as an introduction to the vast amount of work now being undertaken by these laboratories which are engaged on many aspects of research both for industry and for the Government. Nevertheless, visitors were able to see any aspect of the work in which they were particularly interested and the Conversazione proved a great success.

Speaking to representatives of the Press on the second day of the Conversazione Sir Harry Railing, chairman of the G.E.C., stressed the importance of research at the present time and said that it was generally agreed that in this country we could not maintain our standard of living unless by research we improved production methods and increased the output of the factories.

The G.E.C. laboratories were one of the first industrial organisations to be set up in this country. The proposal was first made in 1916 but the laboratories were not formally opened until 1923. The main laboratories now occupy a floor area of about 150,000 square feet and recently it has been necessary to take over additional accommodation on what was formerly the Wembley Exhibition site. The visitor making a general tour of the laboratories has, therefore, a fair amount of ground to cover; buffets at strategic intervals, however, helped to keep the visitor going.

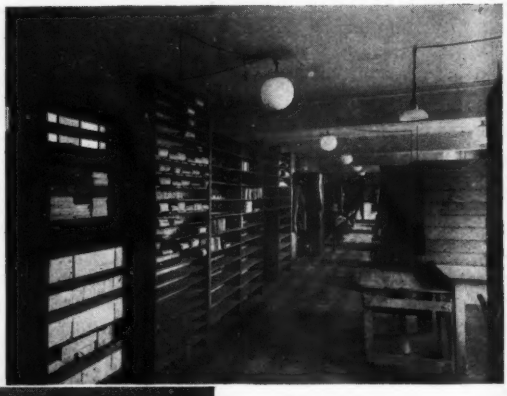
Office Lighting and Decoration

M.O.W. Demonstration Office

A report* on working conditions in the Civil Service, which was published in 1947, dealt amongst other things with the importance of good natural and artificial lighting in offices. The recommendations, though intended primarily for the Civil Service, have a bearing on all offices, and the Ministry of Works has recently set up a demonstration office, or rather a suite of offices, at Ebury Bridge House, London S.W.1, to show the results of the preparatory work which has been carried out to improve working conditions within the service. The offices include clerical and executive offices, typing pool, registry and drawing office.

For the purpose of the demonstration a building is being used which is typical of many pre-war buildings, but it is not an ideal one for the purpose. The natural lighting is considered to be good enough for normal clerical purposes, but is not generally sufficient to enable the rooms to be used to full capacity for special purposes, such as drawing offices. The demonstration is primarily intended to show what can be

* Working Conditions in the Civil Service. H.M.S.O., 1947. 4s. net.



Right:—The Registry at Ebury Bridge House before improvements were made to the lighting, decoration and office furniture.

Left:—The same room improved by the use of light coloured furniture and linoleum and appropriate lighting fittings which help to give the room an air of spaciousness.

done in an existing building by new colour schemes and designs of furniture and equipment.

There is to-day a greater appreciation of the value of colour in everyday life. One object in planning the demonstration office was to create, with as few colours as possible, a sense of spaciousness and a light and cheerful atmosphere. Light but warm colours have been used in rooms on the sunless side of the building and cool colours in rooms on the sunny side. The depth or lightness of tone of the colours depends on the amount of natural light received in the rooms and the nature of the occupation. The colour scheme naturally includes the office furniture and equipment which in general are light in colour. The steel office cabinets and cupboards have been refinished in putty and grey instead of the old familiar dark green.

The lighting varies according to the type of work being done, the standard adopted for the clerical rooms being 6-10 lm./sq. ft. on the working plane. Both tungsten and fluorescent lamps are used. The larger offices are all lighted by tungsten lamps in louvred fittings, each having two 40-w. daylight lamps. The effect of the demonstration is certainly that of very much brighter offices than one usually associates with Government offices.

Fluorescent Stage Lighting

Demonstration in a London Theatre

A demonstration of dimmer-controlled stage lighting by fluorescent lamps was given at the Boltons Theatre, London, on June 10 by Thorn Electrical Industries, Ltd., to representatives of the theatre and cinema industries.

The demonstration showed that by using lamps giving green, blue and red light good colour effects could be produced for stage purposes. The green and blue colours are obtained by the use of suitable powders in the tubes themselves. The red, however, is obtained by the use of filters.

For the purposes of the demonstration footlights, wing floods, and top battens with 2-ft. 40-w. tubes were used and it was apparent that by this means a considerable amount of light could be thrown on to the acting area and draperies. The illumination on the stage is very uniform arising from the design of the units, in which the different coloured lamps were in positions parallel to each other so that there was an almost unbroken line along the footlights and battens. It is possible, however, that fluorescent lighting might be considered to give a rather "flat" effect compared with tungsten lighting which gives a better effect of light and shade—a point which might be of some importance in the lighting of a straight play as opposed to some more spectacular show.

From the point of view of those on the stage fluorescent lighting is, of course, cooler and, without spotlights, there is less glare in the eyes of the artists.

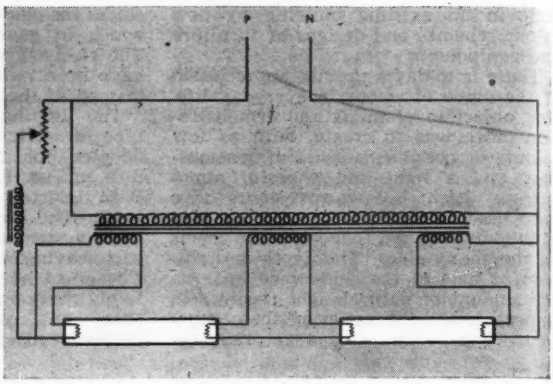
Dimming

The range of dimming required for stage purposes is at least 300 or 400 to 1. The circuit used (see diagram) is a development of the Atlas "Quickstart" circuit. In the normal arrangement of this circuit the filaments are heated by a transformer whose primary is connected across the lamp. When power is switched on to this circuit practically full mains volts are across this transformer, and the filaments are rapidly heated. When the lamp strikes, which takes less than half a second, the volts across the transformer are reduced to about half, and the heating current falls to a low value.

In this circuit the primary of the filament transformer is connected direct to the mains and is entirely separate from the supply to the lamp. This increases the range of dimming to a marked degree, and the light output can be reduced on a 5-ft. 80-watt lamp to about 4 per cent. The range of dimming required is however only obtained by using lamps in which the ratio of diameter to length is much higher. The best lamp for the purpose in the range of present manufacture is the 2-ft. 40-watt lamp, and by using two such lamps in

combination with a filament transformer with an extra secondary winding for the centre pair of filaments, the range of dimming is increased, and the minimum value being about 0.3 per cent.

For effective operation it is essential that there should be a good earth in close proximity to the lamps, and to get not only good dimming but also an effective increase of light output over the same range, it is desirable that the series impedance regulating the voltage should be in the form of one variable resistance in series with each lamp, or in the case of 2-ft. 40-watt lamps, each pair of lamps.



The dimming circuit.

At present, however, there appear to be certain limitations to the dimming system which no doubt will be overcome in due course. One of these is that the dimming or raising of the lights cannot yet be effected with the same degree of smoothness as is the case with tungsten lighting. In particular it does not seem to be possible to dim the lamps to zero, the lamps extinguishing themselves whilst still giving an appreciable amount of light. The re-striking level is at a somewhat higher light output than the extinguishing level.

A quick flash can be obtained with the fluorescent lamps, a noticeable point about which is the complete absence of after-glow during the black-out period.

Efficiency

The efficiency of tungsten lamps used in conjunction with coloured filters is, of course, very low, and by using fluorescent lamps with appropriate powders to give the required colours a much greater efficiency can be obtained. It is still necessary, however, to use a filter if a saturated red colour is required.

This higher efficiency means a considerable reduction in the power load, as an instance of which it was quoted that a theatre with an installed capacity of 80 kw (stage and auditorium but excluding spots) could be relighted with a total load of 18 kw (excluding spots) by using fluorescent lighting.

The system is equally applicable to auditorium lighting with the advantage that, as the dimming requirements are not so strict, 5-ft. lamps can be used.

Engineering Scholarships

Details of the Whitworth Scholarships in engineering, to be offered for competition in 1950, are announced by the Ministry of Education.

Two senior scholarships and five scholarships will be available for candidates of British nationality who are not more than 26 years of age and who have had practical experience in engineering.

Whitworth Senior Scholarships are for candidates who possess an engineering degree or a Higher National Certificate with two distinctions, or are in the last year of a course leading to one of these qualifications. The annual value of the awards is £325, tenable for two years for a course of further training in industry or for research work. Candidates are required to submit a thesis on one of a number of specified subjects.

Whitworth Scholarships are for students whose further education has been limited to evening classes. Their annual value is £200, though this amount may be increased. They are tenable for three years either in industry or at an educational establishment, and will be awarded on the results of the Whitworth Scholarships Examination to be held in April, 1950.

Further details may be obtained from the Ministry of Education, Curzon-street, London, W.1. The closing date for the competition is January 15, 1950.

THE B.E.P. CONVENTION

Some Notes on the Lighting Exhibits

The first British Electrical Power Convention was held at Torquay from June 20—24. At the exhibition nearly 100 manufacturers were represented, including a number of firms in the lighting industry. The exhibition was held in a marquee, promising enough for an agricultural show, but scarcely, one would think, for the more exotic products of a highly technical industry. Surprisingly, however, this exhibition possessed a *soignée* appearance seldom encountered at exhibitions held in more sophisticated surroundings.

In making the fullest use of the available space the organisers, the Exhibition Department of the British Electrical Development Association, contrived to disguise, perhaps fortuitously, the "big top" nature of the accommodation. In doing this, however, none of its advantages were lost, the whole interior giving an impression of light, colour, and airiness, notwithstanding the hot weather and bright sunshine outside. (Illuminating engineers will be interested to know that the level of illumination, with bright sunshine out of doors (3.30 p.m.), ranged from 300—400 lumens per sq. foot in the centre aisle to between 150 and 200 in the side gangways.) Lighting conditions were not only extremely good quantitatively but the diffusion through the canvas roof removed all harshness without imparting flatness, the exhibits being revealed therefore to full advantage.

The exhibition planners' difficulty is to achieve coherency in layout without undue regimentation in stand design. At the Torquay exhibition this was pleasantly managed by imposing uniformity in facia height, standardisation of lettering and colour. Variety and colour were introduced by small obliquely mounted banners projecting from each stand, on which the exhibitors were able to use monograms, trade marks, etc., in their individual colours. Flowers were used liberally and a very modern touch was imparted by the central pavilion which accommodated

The Grand Hotel, Torquay, headquarters of the B.E.P. Convention, floodlit with Philips 140w. sodium lamps. The towers are lighted with mercury lamps.

the E.D.A. Exhibition office and the E.I.B.A. and E.A.W. stands.

Lighting Exhibits

To single out any exhibit for special mention would be invidious, space being limited and many exhibitors having had to use great restraint in showing only representative specimens of their products.

Thorn Electrical Industries

A range of "Atlas" lamps and fluorescent lighting fittings of clean lines, several of them making extensive use of fluted "Perspex" for light control and diffusion. A feature of some of the Atlas fluorescent fittings is the facility of removing top reflectors for cleaning without having to switch off or disturb the lamp. The Atlas instant start control equipment was prominently featured. A scale model of the company's 3 x 80 watt fluorescent street lantern attracted interested comment.

Simplex Electric Co. Ltd.

A limited selection of Simplex lighting fittings were effectively displayed. These included the popular reflector type outdoor floodlight, and the "Prismax" bulkhead fitting with wide flux dispersion and designed to be fitted in any position.

General lighting for the stand, which was most attractive, was provided by Simplex L S 1 (200 watt max.) general purpose indoor floodlights which permit lighting emphasis on any selected feature.

General Electric Co. Ltd.

The extremely wide range of G.E.C. products must have given the firm several headaches in deciding what to leave out. Lighting products of G.E.C. were represented symbolically only by a restrained display of 8-ft. fluorescent tubes forming part of a taking ensemble of other G.E.C. products.

Revo Electric Company Ltd.

Street Lighting activities were conveyed by the presence of a Revo 250/400 watt side entry lantern on a truncated mounting with the background support of a mural photograph of the installation in which it was first used. Known as the C 12628 and not yet "named," this lantern embodies an interesting optical arrangement with internal mirrors and an outer bowl providing diffusion and refraction. Attractive fluorescent lighting fittings with pleasing appearance and egg box louvres were also displayed.

Benjamin Electric Co. Ltd.

Benjamin lighting products are too well known to need detailed description here, and needless to say a representative display was provided, including the robust and unusual "stock bin" unit to take up to a 100 watt filament lamp.

A most attractive feature of the stand was a tastefully arranged display of ancient and medieval lamps forming part of the "George Herbert" collection and ranging from an Etruscan lamp of *circa* 600 B.C. through Roman times to candlesticks of the pre-gas and electricity era.

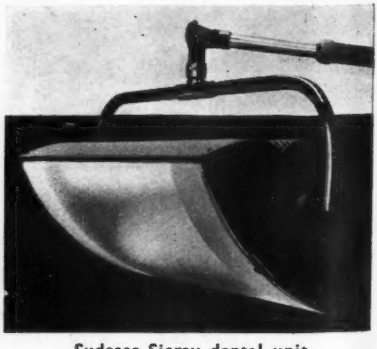
Edison Swan Electric Co. Ltd.

The "London Minor" lantern for Gp. B. Street lighting was in evidence together with a selection of the popular Ediswan lighting fittings.

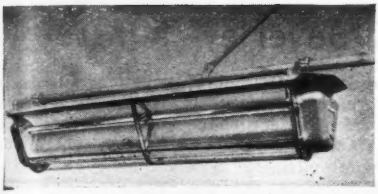
Like their many competitive friends in the industry Ediswan must have exercised great care in selecting a few items to exhibit from a very wide range. Fluorescent fittings were well displayed, one of them being "exploded" to show constructional details and accessory mounting. Mention of this stand would be incomplete without referring to the "Ensur-a-Lite" emergency lighting equipment.

Siemens Electric Lamps and Supplies Ltd.

A lightly applied transverse line pattern on an attractively shaped 2 x 40 watt fluorescent fitting immediately took



Sudesco-Sieray dental unit.



The Mazda fluorescent street lighting lantern series 750.

the eye. Most interesting, too, was the stirrup mounted fluorescent lantern for Group B lighting, designed for 2-40 watt lamps, minimum projection from the column axis being thus achieved very neatly.

The Siemens cabinet colour matching unit and the fluorescent (2 x 40 watt) dental inspection lamp will find wide application in their respective spheres. The former provides facilities for "daylight" matching and appraisal, with facilities for instantaneous change to filament lighting conditions, most useful in selecting fabrics for evening wear, soft furnishings, etc.

British Thomson-Houston Co. Ltd.

Street Lighting formed the principal motif of the B.T.H. stand, with a background of illuminated murals on which the principles of spacing, height, overhang, and the importance of siting were clearly shown. The display was supported by examples of the company's well-known street lighting fittings, particularly the stylised "600" series, in sizes for all classes of highway or open space. Pride of place, however, was accorded to the 3 x 80 watt fluorescent street lantern for Group A roads.

Ekco-Ensign Electric Ltd.

A most attractive display of Ekco-Ensign lighting products ranged from projection lamps for 16 mm. film projectors, train and bus lamps to lamps for special service in wattages from 15 to 1,500.

The 1 x 40 watt and 2 x 40 watt series of shop window reflectors were worthy of note; available with these are sets of transverse louvres which efficiently limit the side-spill sometimes so distracting in otherwise good shop windows.

Decorative fittings showed a clean sense of function allied to good lines.

E.L.M.A. Lighting Service Bureau

A stand of lively and attractive interest worthy of L.S.B.'s silver publicity year. Pillar charts summarised the progress in lamp efficiency and price reduction in the 25 years of E.L.M.A.'s existence. The catholicity of L.S.B.'s associations with all bodies interested in promoting safety and efficiency, and appreciation of good illumination was symbolically, but unmistakably, portrayed.

Metropolitan-Vickers Electric Co., Ltd.

The "S.O. 50" lantern, passed by the Royal Fine Arts Commission, for 85 watt or 140 watt sodium lanterns, was displayed with considerable pride as the first of all "Perspex" totally enclosed refractor lanterns for street lighting. Very light, with canopy of opal "Perspex" for side entry, and a snugly fitting clear "Perspex" bowl with prisms hermetically sealed from dust, the "S.O. 50" achieves a high standard of design. Relamping is easy, access being gained by a simple but robust clasp which allows the bowl to pivot downwards towards the column when released. High optical efficiency is claimed.

Metrovick's other lighting exhibit was the well-known "Trafford" 250/400 watt mercury lantern which now has an aluminium body instead of cast iron.

General Conclusion

Although approached with a critical outlook, the excellent layout of the exhibition, its colour and lightness in combination with excellent display and pleasant enthusiasm contrived at once to disarm.

Lighting equipment and accessories formed an important section, but the overall impression was due in no small part to the presentation of the extremely wide range of electrical equipment as a whole.

There need be no apprehension about a future tented exhibition if on a similar occasion no permanent building is available.

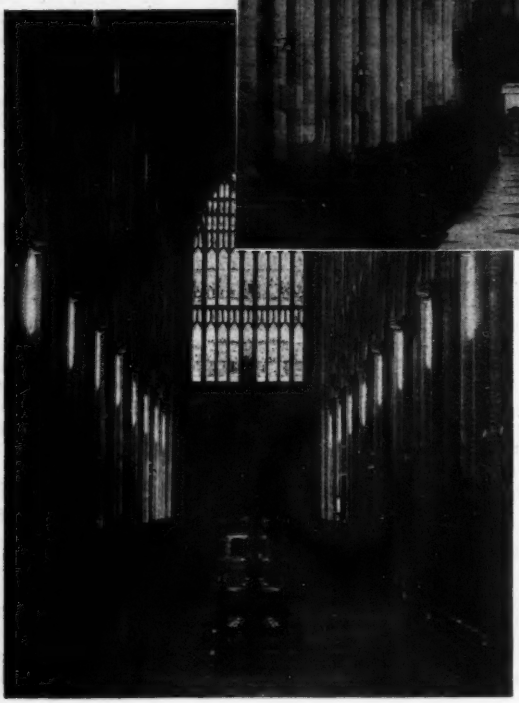
The programme of the Convention also included a number of papers on technical matters relating to the supply industry and social events. The whole proceedings were excellently arranged and promise well of future conventions.

Interior Lighting of Beverley Minster

What is probably a unique lighting system has just been approved for installation in the Minster at Beverley, Yorkshire. This proposal follows an experimental fluorescent lighting installation designed and carried out during 1948 by the staff of the Hull Sub-Area of the Yorkshire Electricity Board.

Before the experimental installation was carried out, the use of more orthodox types of church fittings was considered but none appeared to meet the particular architectural requirements of the building and it was considered essential that no disharmony should be created between the lighting fittings and the architectural features.

On entering the Minster one is immediately struck by its beautiful proportions and by the double row of clustered pillars, each composed of an assemblage of long and slender shafts rising from the ground to the spring of the aisle arches and continued by shafts on the wall to the



Above:—The interior of the Minster at night with the fluorescent lighting switched on. View looking east, i.e., as seen by the congregation.

Left:—View from the lectern.

Showing the specially designed fluorescent lighting fitting. The choke and starter switch are contained in the end piece at the top.

spring of the nave vaulting, there spreading in all directions to form the ribs of the vaulted roof—all characteristic features of Gothic architecture. These rising pillars with their associated shafts, some of which are plain and others elliptical, seemed to be particularly suited for the installation of fluorescent tubes.

The east end of the Minster, incidentally the oldest, forming the Lady Chapel and chancel, was selected for the first experiment and fluorescent tubes were erected on the east side of the Purbeck marble pillars in the triforium so that the tubes were completely unobtrusive. Other tubes were fitted on appropriate pillars to provide adequate illumination on the rich tracery and sculptured details of the altar screen. The installation was first connected for an evening service in April, 1948.

Several church dignitaries, antiquarians and archaeologoists of note subsequently visited the Minster to inspect the installation and after further consideration it was decided to extend the experiment into the nave and parts of the main transepts. In dealing with the nave, the fluorescent tubes were installed in the channels between adjacent shafts of the pillars just below the capitals, the base of the tubes being some 14 ft above the floor level. Great care was taken in the installation so that no member of the congregation in the nave would see any part of the lighting source when facing east. This installation was completed during the autumn of 1948 and was in general use for the remainder of that winter.

The Minster authorities during this time visited other church buildings to help form an opinion on the relative merits of the experimental installation as compared with lighting installed in other churches. It was finally decided, however, to proceed with the permanent installation of fluorescent lighting and it is hoped that this willl be completed before the autumn of 1949.

A special fluorescent fitting has been designed to meet the particular requirements of the building and the entire lighting system will be controlled from a master switch panel in the verger's pew in the nave.

Traffic Tunnels

The April, 1949, issue of Philips "Technical Review" contains an article "On the Illumination of Traffic Tunnels," by A. M. Kruithof. A traffic tunnel, for instance, one under a river, cannot be illuminated in a practicable manner to the same level of brightness as exists outside in full daylight. An example of such a tunnel is given to demonstrate the trouble experienced by the driver of a motor vehicle passing through the tunnel, due to the great change in the level of brightness. The nature of these troubles can be considered from the point of view of brightness adaptation and from that of glare. It appears that the data regarding adaptation to brightness are inadequate to provide a basis upon which anything definite can be concluded about the quality of vision. Various performances of the eye, e.g., contrast sensitivity, are reduced by the glare. Data available in the literature on the subject give no satisfactory explanation of the difficulties. The article discusses the results of a laboratory experiment carried out to investigate the change in contrast sensitivity when approaching and entering a tunnel. The conditions assumed in the case of the tunnel chosen as an example resemble those existing in the tunnel under the River Meuse at Rotterdam.

Lighting at the Head Offices of the Rotterdam Bank

*By Joh. Jansen**

The reconstruction of the centre of Rotterdam, which was destroyed in 1940, has given opportunities for the application of many new ideas on a large scale, including new lighting systems. One of the first reconstruction jobs to be completed was the building of the head offices of the Rotterdam Bank. This building has a floor space of about 180,000 sq. ft., ground floor and basements measuring 42,500 sq. ft. each and four stories of 24,000 sq. ft. each. The attics, covering another 24,000 sq. ft., are not considered in this article.

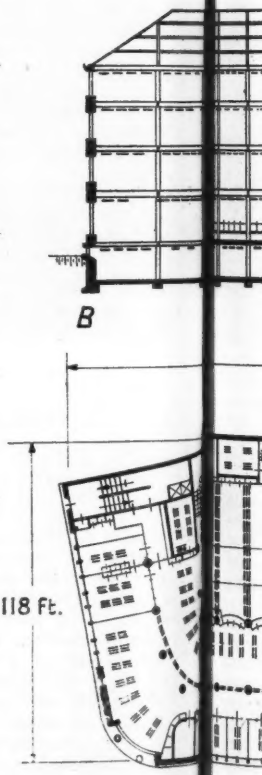
The building plans were actually drawn up during the first years of the war, and discussions about the lighting begun with the Philips Lighting Department at Eindhoven in October, 1942. The architect, H. F. Mertens, had the difficult task of planning all the technical projects in connection with this large building, including the heating, air-conditioning, acoustics and lighting. In spite of the country being practically isolated from the outside world during the years of occupation he had to ensure that the projects planned would not be out of date by the time they could be put into execution. This gave rise to many problems, particularly in regard to the lighting, as with the innovation of the tubular fluorescent lamp illuminating engineering was at that time just beginning to develop along quite new lines.

One after another four different schemes for the lighting of the offices were considered, each reflecting the stages of development in the years since 1942. At first the lighting was planned with mixed mercury and tungsten lamps, then with TL-100† lamps, then again with a hypothetical tubular lamp having a luminous flux of 3,000 lumen. Finally it was decided to use TL-40‡ lamps, which, for the greater part, were mounted in threes in louvred metal fittings on the ceiling (Fig. 2).

The offices proper cover about 80,000 sq. ft., and in these 4,000 lamps were installed, giving an average luminous flux of approximately 100 lm./sq. ft. In the large halls a horizontal luminous intensity of 35-45 lm./sq. ft. was obtained, though it is expected that this figure will drop to about 30 lm./sq. ft.

At this level of illumination incandescent lamps would have generated too much heat, quite apart from the higher current consumption; for the flux of 100 lumens per sq. ft. of floor space now installed the consumption is 2.4 w./sq. ft., which amounts to 192 kw.; whereas with incandescent lamps of 200 w. (6.7 w./sq. ft.) it would have amounted to 536 kw.

Everyone concerned is delighted with the result, and whatever further developments may be, this installation is certainly a milestone in the development of fluorescent lighting. This



* Philips Lamp Works, Eindhoven, Holland.
† 4-ft. 40-w. fluorescent lamps with side caps.
‡ Standard 4-ft. 40-w. fluorescent lamps.

is the first time that modern lighting ideas and materials have been applied in Europe on such a large scale. Of greater importance to those using these offices, however, is the fact that the lighting is giving satisfaction not only aesthetically but also qualitatively and quantitatively. Even though other installations of the future may be different, the present system will answer all requirements for a long time to come.

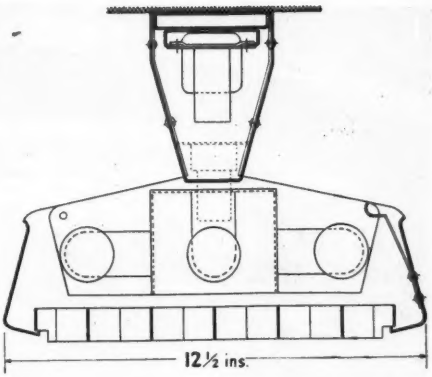
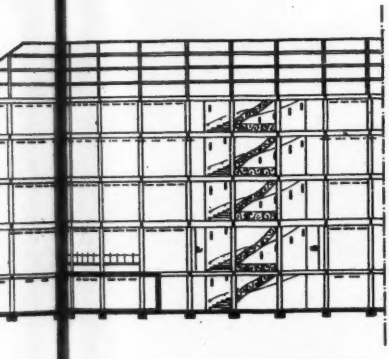
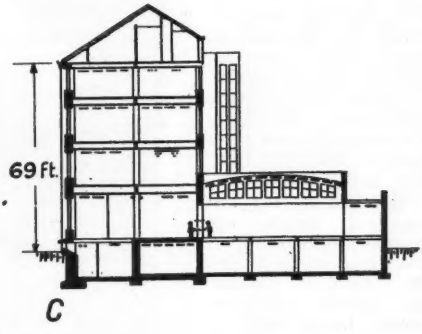
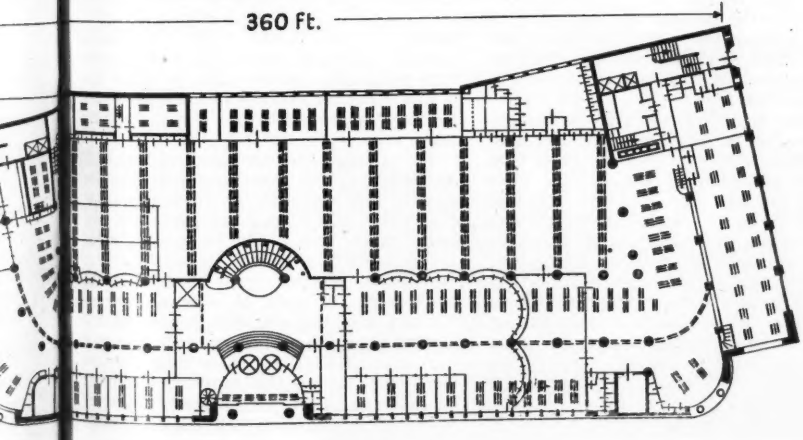


Fig. 1. *(below)*. Plan and elevations of the building.

Fig. 2. *(right)*. Section through the lighting fitting used.







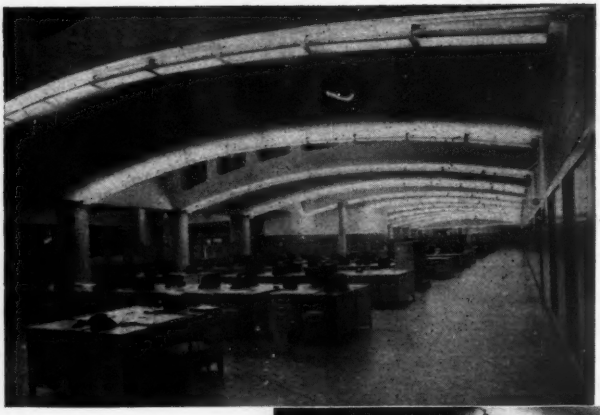


Fig. 3. (*left*). The general office illuminated to an average value of 40 lm/sq.ft., the lighting fittings being mounted on the lower part of the arched ceiling.

Fig. 4. (*below*). The lighting in the counter hall.

In accordance with new lighting requirements the illumination was fixed at an average of 30 lm./sq. ft. for normal working conditions. Mounting the lamps in long rows ensured that the light was well diffused.

Since lines of unscreened lamps are rather unpleasant, it was decided to mount the lamps in fittings. A logical solution would have been to mount the lamps in channels in the ceiling, but by the time preparations had reached that stage the ceilings had all been occupied by the heating and ventilation installations.

In order to match the lighting installation as far as possible to the form of the interior a fitting was designed that could be mounted in continuous lines directly against the ceiling. It was designed so that it would give not only sufficient direct lighting on the working plane, but also a certain amount of indirect lighting from the ceiling and walls. To save costs it was decided to have two or three lamps in each fitting. Finally, there being the scarcity of glass to be reckoned with, an all-metal fitting was designed.

This fitting was made of sheet iron and can be used with either one, two or three TL-40 lamps. The mounting channel carrying the chokes and starters was purposely made high so that the lamps hung far enough below the ceiling to throw some light upon it over a fairly wide area.

The lamps are screened underneath by metal louvres. Sections of this louvre let the light through at an angle of, at the most, 2 x 70 deg. measured in the longitudinal axis of the lamp and under an angle of 2 x 60 deg. laterally.

At the present time, when twin-starters can be used, an even number of lamps per fitting would be preferred, but at the time when this project was put into execution (1946) these twin starters were not yet on the market. In most cases three TL-40 lamps per fitting were installed in order to get the necessary

luminous flux. In the offices units of 2 x 3 lamps were installed, so that in general it would be a fairly easy matter to use for six lamps three twin-combinations. For the sake of uniformity and in order to fit the lighting installation in the general offices into the architecture of the building as far as possible, in the majority of the offices the same type of fitting was used. A more decorative style of lighting was used only in the entrance hall, in the safe-hall, the managers' rooms and the board room.

General Offices

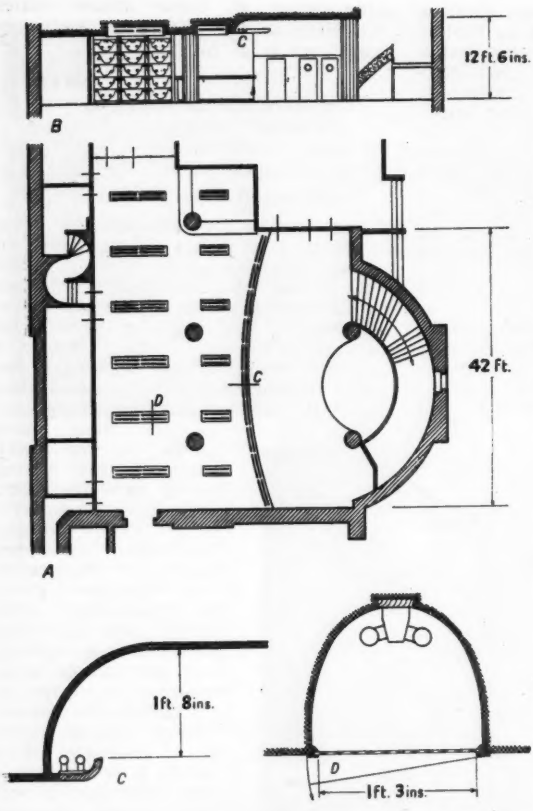
The general offices are made up of the general office hall (Fig. 3), the adjoining counter hall (Fig. 4), the stenographers' rooms, the consulting rooms and the large offices on the upper stories. The illumination in these offices varies according to the nature of the work done, and is as follows:—

	Lm./sq. ft.
Main office and the offices on the upper stories	40
Typists' rooms, etc.	60
Public counter halls	15-30
Consulting rooms	20

The area of the large general office is 250 ft. x 50 ft., the height under the arches averaging 14 ft. (Fig. 3). Daylight enters this hall through windows in the vertical planes of the saw-tooth-shaped roof. The lamps for the artificial lighting could have been mounted into the ceiling of the high bays, the lamps thereby being more screened from view. It would not have been necessary to use many more lamps, but the lower parts of the ceiling would have been left very dark compared with the strongly illuminated bays between. Preference was therefore given to mounting the lamps under the lower parts of the ceiling, and the fittings were mounted in rows of 11 against the curved ceiling. In this part the luminous flux per sq. ft. is 84 lumens. The illumination on the desks in the

Fig. 5. (*above*). The entrance hall showing the lighting on the staircase.

Fig. 6. (*right*). Lighting in the safe vault vestibule.



two large counter halls harmonises particularly well with the architecture by the arrangement of the lines of light. The illumination varies from 25-30 lm./sq. ft., and in the gangway behind the pillars 10 lm./sq. ft. On the counters 15-30 lm./sq. ft. was obtained, so that there was no need for any local lighting (Fig. 4).

In the entrance hall (Fig. 5) is a cornice made of patterned frosted glass, inside which are two staggered rows of TL-40 lamps, so that notwithstanding the short distance away from the rear wall there are no

Fig. 7. (*left*) Plan and elevations of safe vault vestibule.

Fig. 8. (*below*). Indirect lighting in the corridor leading to the managerial offices.

middle of the hall varies from 35 to 45 lm./sq. ft. and on the desks in the far corners it amounts to about 30 lm./sq. ft.

In the typists' offices and the mailing rooms the same type of fitting was installed in rows of two against the ceiling with a spacing of just over 5 ft. between the rows. Here the luminous flux is 180 lm./sq. ft. and the illumination on the desks 64-66 lm./sq. ft.

The lighting in the

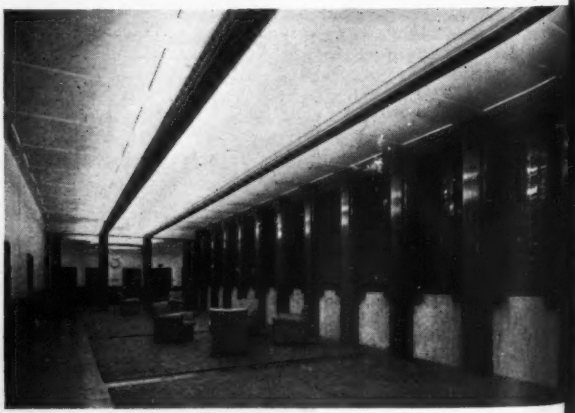


Fig. 9. (*above*). The circular cornice at the end of the corridor shown in Fig. 8.

Fig. 10. (*right*). Showing the lighting arrangements for the corridor.

visible patches caused by the ends of the lamps.

The lighting of the staircase was very simply solved by mounting the lamps against the walls. For the lighting of a passage way there is no objection to this—though it would have looked better if the lamps had been placed in small niches in the wall.

On the ground floor 1,200 TL-40 lamps were installed over an area of 35,000 sq. ft.

Mention should also be made of the more decorative lighting in the safe-vault hall, the managers' rooms, the passage leading to the managerial offices, the board room on the first floor, and finally the canteen on the second floor.

The safe-vault vestibule is indirectly lighted from a cornice in the partly-dropped ceiling. In the lower part TL-40 lamps are mounted in troffers let into the ceiling (Figs. 6 and 7).

The corridor leading to the managers' rooms is also indirectly lighted, two rows of lamps being mounted in profiled wooden cornices (Fig. 8). The illumination in the passage is about 8 lm./sq. ft. The circular cornice in Fig. 9 has a diameter of 10 ft. and contains two rows, each of seven 4 ft. 40-w. lamps, the rows being staggered in relation to each other.

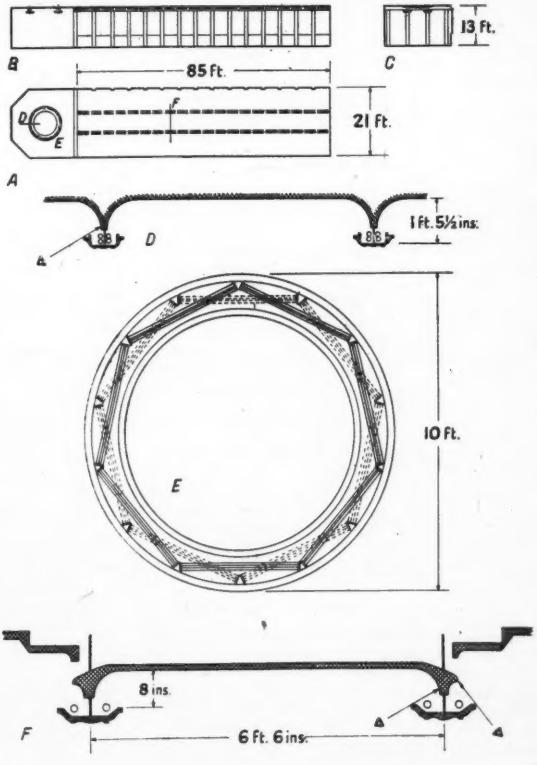


Fig. 10 shows the arrangement of lamps in the corridor cornices and in the circular cornice at the end of the corridor.

An attempt at rather more decorative lighting was made in the managers' rooms. In one typical office 4-ft. lamps are mounted in a cornice underneath the ceiling for indirect lighting, direct lighting coming from an ornamental fitting containing four lamps mounted on the ceiling in the centre of the room. The board room also has indirect lighting from 4-ft. lamps, with wall brackets containing 40-watt incandescent lamps.

The Illumination of the Snellen Chart

A paper of interest to illuminating engineers appears in the May issue of the "British Journal of Ophthalmology," and deals with the illumination of the Snellen Test Chart for Visual Acuity used for the routine testing of distance vision. During the course of a general study of the relationship between illumination levels and visual acuity, Drs. M. Gilbert and R. G. Hopkinson, of the Building Research Station, selected a number of observers with normal and with slightly subnormal vision for their tests. These observers had small or medium refractive errors, hypermetropic, astigmatic, myopic, etc., which rendered their distance vision below normal.

It was found, as had been previously reported by other experimenters, that the number of lines which could be seen on the Snellen Chart was influenced by the illumination upon it, but also that the effect of a change of illumination was greater for those observers with visual defects than for those with normal vision. A rough working rule for the guidance of clinicians is, that a 1: 10 change in illumination level makes a difference of one whole line on the visual acuity assessed by the Snellen Chart. However, normal observers will show rather less than this difference unless the illumination is of a very low order (e.g., less than 1 lm./sq. ft.). Observers with indifferent vision will, however, show more than this difference at all levels of illumination, some individuals being more sensitive to changes in illumination than others.

These facts, whilst of less importance from the point of view of the optician's use of the Snellen Chart merely as a relative check on the accuracy of his prescription, are highly significant if the Snellen Chart is used as a pass test of visual acuity for entrants to a trade or profession. Thus a man with a small degree of short sight might succeed in passing the test for entrance to his trade if the test chart were illuminated by full daylight, but his vision at low levels of illumination might be so much below normal that he might well be a danger to himself and to others.

The data from this study suggests that it is necessary to set some standard or standards for the illumination of test charts used for entry to a trade, and that it is not sufficient to indicate that the chart should be set up in a "good light." The I.E.S. can certainly be of assistance in any such standardisation.

SITUATIONS VACANT

"ELFA" Industrial Fittings Manufacturer requires Representative to develop sales in Lancashire area; permanent position and good salary.—Write, stating age, qualifications, Box No. 798.

LIGHTING ENGINEER required for North-East area by sole distributors of well-known make (Association) Fluorescent Lighting Fittings. Must be capable of organising Lighting Sales and preparation of complete schemes. Write, in confidence, stating age, experience, and salary required, to Box No. 799.

The Manchester Centre of the I.E.S. announce that arrangements have been made to hold a course for the final grade of the City and Guilds examination in illuminating engineering at the Manchester College of Technology. This will be in place of the course for the Intermediate which has been arranged in the past.

Congratulations to Mr. S. M. Cox, research manager to the Sunderland glass manufacturers, James A. Jobling and Co. and a member of the I.E.S. Newcastle Centre, on being awarded the M.B.E.

New Lighting Installations

Showroom Lighting

The provision of adequate overall illumination without discomforting glare from the necessarily large number of fittings employed is a noteworthy feature of an installation recently completed in the showrooms of Messrs. Kennings' garage at Sheffield. These showrooms are the largest of their kind in the city. The new lighting scheme has considerably added to the attractiveness of the display of both private and commercial vehicles.

In all, a total of 50 bare lamp fittings are employed, each using one Mazda 80-watt 5-ft. fluorescent lamp as light source. These fittings are mounted at a height of approximately 16 feet above floor level and behind cross girders on the ceiling of the showroom, with the result that, in viewing the showroom from outside, no light source is visible. An average light intensity of 13 lumens per square foot has been secured.

The lighting scheme was planned by the British Thomson-Houston Company, Ltd.

Lighting in the Bank of New Zealand

With the installation of fluorescent lighting the Wellington branch of the Bank of New Zealand is now considered to be one of the best-lit bank chambers in New Zealand.

Owing to the somewhat unusual shape of the building, the arrangement of the lighting fittings does not conform to a regular pattern, but they are nevertheless sited in the most advantageous positions. The floor area is in the region of 8,700 square feet, and twin-lamp fittings each illuminate an area of 125 square feet, a total of 70 units being used. The fittings were specially developed in New Zealand and are designed for use with two Mazda 80-watt fluorescent lamps side by side. A cover box is incorporated at both ends of each fitting, serving both to house the control gear and act as a flicker shield.

The mounting height is approximately 20 ft., and the installation gives an average illumination level of about 25 lumens per square foot over the whole

Showing the lighting in a Sheffield car showroom as seen from the street.

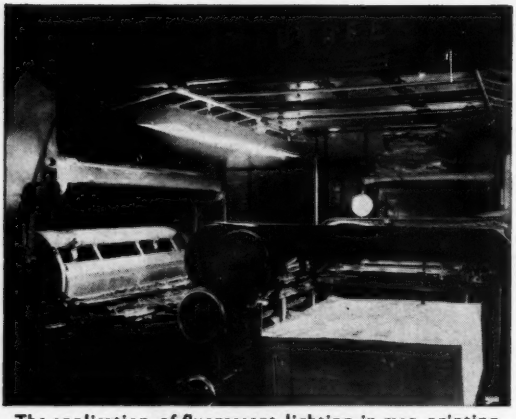
area—a marked improvement on the original figure of 3-4 lumens per square foot.

Map Printing Shop

Modern colour printing presses, though largely automatic in operation and faithful in reproduction, present even the skilled operator with problems undreamed of by his predecessors. During the time of "making-ready" and the long printing runs, many valuable hours can be saved, output increased, and the many colour problems involved effectively overcome if adequate illumination is installed and placed where it is needed.

With the end in view fluorescent lamps in trough reflector fittings have recently been installed in the printing shop of George Phillip and Son, Ltd., the well-known firm of map printers and publishers. The machine room of this firm is equipped with presses for both letterpress and lithographic work, the latter being used for the printing of atlases and wall maps in colour, for which the company has earned a valuable reputation.

The Bank of New Zealand, Wellington.



The application of fluorescent lighting in map printing showing a fitting attached to the frame of a machine for lighting automatic feeder mechanism.

Illumination is provided by an installation comprising 98 fittings, each containing one Osram 5-ft. 80-watt warm-white lamp. The guiding factor in suspending the fittings has been the location and size of the machines. Some of the larger letterpress machines are lighted by three lamps, arranged over the feeder end, above the tapes along which the sheets

travel after receiving the impression, and at the delivery end.

In the lithographic section of the shop the largest type of machine is the Crabtree offset press, printing sheets in two colours at one operation. Employed on six-colour map work, sheets are completed in three printings, each machine having a capacity of approximately 3,000 quad demy sheets per hour. A trough fitting is suspended from the under-side of the main frame of the machine so as to illuminate the automatic feeder and associated mechanism. Another similar fitting is placed to facilitate inspection of the printed sheets as they are delivered.

The illumination over the machines and throughout the shop ranges between 15 and 20 lumens per square foot. This installation was designed and carried out by the Alliance Electrical Co., Ltd., of 2, Henrietta-street, London, W.C.2.

Lighting for Linen Weaving

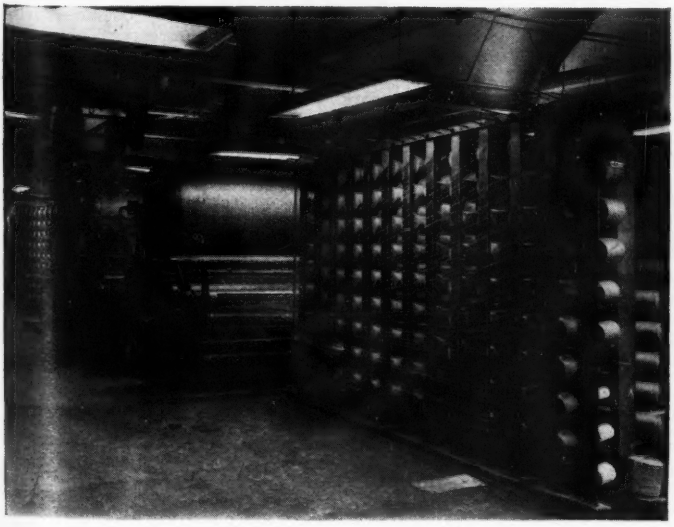
The linen mills of Messrs. Scott and Fyffe, Ltd., Tayport, have recently been relighted, using 5-ft. fluorescent units in the weaving shed mounted at 9 ft. above floor level, the illumination on the threads being 25 lumens per sq. ft.

In the weaving alleys the fittings are mounted centrally between each set of looms at right angles to the weft, so that the heald wires and warp threads can be easily defined by the operative while the maximum amount of shadow dispersion has been obtained.

In the case of the warping machine, where the yarn is taken from the creel and drawn through starching rollers before being beamed, the fittings, again mounted at 9 ft., were positioned in order to obtain the maximum light on the threads leaving the creel, so that any breakages could immediately be detected.

The erection and wiring was carried out by Messrs. Small and MacDonald, Ltd., Glasgow, the scheme being designed by Metropolitan Vickers Electrical Co., Ltd.

Metrovick fluorescent lighting has also recently been installed in the Plover Mills of Messrs. Smith and Calverley, Ltd., for the spinning mules and the carding machines. In the case of the latter machines angle reflectors have been mounted experimentally to provide light at the condenser end. A feature of the shed which was of great help to the lighting engineer in designing the lay-out was the 90-ft. span without supporting pillars. The average illumination on the working plane is 16 lumens per sq. ft., some 84 2-lamp, 5 ft. fittings being used.



Lighting in the linen weaving shed of Messrs. Scott & Fyffe, Ltd.

Interior Lighting Practice in New Zealand

By R. D. NEALE

The standard of lighting practice in New Zealand has improved considerably during the past decade. Unfortunately, this statement must be qualified by adding that, with some notable exceptions, the improvement is confined chiefly to increased levels of illumination, intelligent planning of the layout being only too often conspicuous by its absence.

Before World War II there were few, if any, electrical firms with qualified illumination engineers on their staffs, no independent lighting consultants, and very few architects who laid any claim to ability in the lighting field. Good work was done, and still is done, by local authority electrical engineers, who have always been obliged to study street lighting, and whose ability in that sphere was extended to interior illumination. When consulted, which was rarely, their advice was usually valuable, but as a general rule the lighting of buildings, in respect of both quantity and quality, was left entirely to electrical contractors. Now, in this country, electrical contractors have to qualify for registration as wiremen, which involves the passing of rigorous trade tests and examinations; but they are not qualified as illuminating engineers, and it is no reflection upon them to say that on the whole they are not equipped to plan lighting schemes satisfactorily.

As an illustration of the poor standard of lighting, a survey made in 1943 of most of the main lecture rooms and laboratories in one of the university colleges disclosed mean general illuminations of the order of 2-5 ft.c. and distribution in many cases deplorable. The worst lecture room tested gave readings from less than one to about six ft.c., with a mean of about 2.5. One laboratory yielded a maximum reading of 3.3.

Fluorescent Lighting

The advent of fluorescent lighting has directed the attention of the public to the possibility of much improved lighting. Retail shops in particular have spent a great deal of money during the past five years, installing bare fluorescent lamps—the louvre and the "Perspex" cover are only now beginning to be available here, and are still extremely expensive. The all-round improvement in levels has been most beneficial, but what is still needed is more lighting knowledge amongst architects, more qualified men working for the firms who sell lighting equipment, and, the writer would venture to suggest, a few well-qualified, specialist lighting consultants.

An interesting sidelight on improved artificial illumination is afforded by the reaction of many users to their new fluorescent installations. One of the main selling points for fluorescent lamps is their low consumption in relation to incandescent, and the first electricity account after the changeover is awaited with the pleasant anticipation of considerable saving to offset the high cost of the new installation. Many find to their dismay that the bill is higher than it was before. The reason is usually two-fold: an old low level incandescent scheme has been replaced with an adequate fluorescent one, consuming as much as, or more than, its predecessor: the better lighting makes a marked difference to the illumination even during the daytime and so is switched on hours before the time at which the old one was ever of any use. The higher account follows inevitably; but it can be a matter of considerable difficulty to persuade the disgruntled user that he has not been deliberately misled.

It should, in conclusion, be mentioned, that some of the blame for poor lighting here must be saddled on the high first cost of a well-designed scheme. Fluorescent lighting, with bare lamps, including wiring, cost in 1944 at least £200 per kw. installed, and even to-day rarely less than £130 per kw. It is no matter for wonder that with prices of this order, users are hesitant about making improvements to their installations.

REVIEWS OF BOOKS

Lighting Technique. By B. F. Federov. (Translated from the Russian by W. R. Stoker, with additional sections by W. R. O'Dea. Pp. 299, with 128 figures in text. Hutchinson's Scientific and Technical Publications. Price 25s.)

This book is both useful and interesting since it enables the reader to form a good idea of illuminating engineering in the Soviet Union to-day. The earlier chapters deal with fundamental concepts, with the eye and vision and with photometry, both visual and photoelectric. The treatment is generally orthodox (although early in the first chapter the wave-length of maximum luminosity is stated in four places to be 0.566μ instead of 0.555μ), but the description of bench photometry is very brief, the substitution method being mentioned only by implication. It is interesting to notice that the instrument described as the S.O.I. (State Optical Institute, Leningrad) illumination photometer is an exact copy of our old friend the Trotter Luxometer.

The chapters on light sources and lighting fittings are well written and give ample details of Russian production in these fields. The following three chapters deal respectively with lighting calculations, with the lighting of interiors and with outdoor lighting. Again there are very full details of the lighting codes, current or proposed, for Russian factories, outdoor work places and streets. The book is mainly intended for students and there is an excellent collection of exercises.

The translation is remarkably clear and so are the diagrams with which the text is plentifully illustrated. There are, however, certain terms and turns of phrase which will strike the illuminating engineer as unfamiliar; perhaps the explanation is to be found in a note by the translator on p. 272 which reads as follows:—

> "The latest information on lighting in this country will be found in a paper entitled *Street Lighting*, read before the I.E.E. by E. C. Lennox early in November, 1945, and published in Part II of the I.E.E. journal."

Most readers of "Light and Lighting" (and no doubt Mr. Lennox among them) will wonder that anyone undertaking the translation of a book on lighting should be so completely unaware of the existence of the Illuminating Engineering Society and its Transactions, and of the very considerable literature in English dealing with the subject.

The additional chapter by Mr. O'Dea is a somewhat brief treatment of fluorescent lamps and their applications, including flash discharge lamps.

Basic Technical Electricity. By H. Cotton, M.B.E., D.Sc., M.I.E.E. (Cleaver-Hume Electrical Series; pp. 238, with six plates and 74 diagrams. Price 8s. 6d.)

"Basic Technical Electricity" is the first of an electrical series edited by Professor Cotton and gives the essential knowledge on which the remaining books in the series are based. It is intended for those making private study and being well laid out and illustrated it should prove useful to the student.

Dealing as it does with basic electrical principles, there is little mention of light in this book but another volume in the series deals with electric lighting.

Stage Planning and Equipment for Multi-purpose Halls. By P. Corry. (The Strand Electric and Engineering Co., Ltd., London; 115 pp., with 41 illustrations. Price 5s., by post 5s. 4d.)

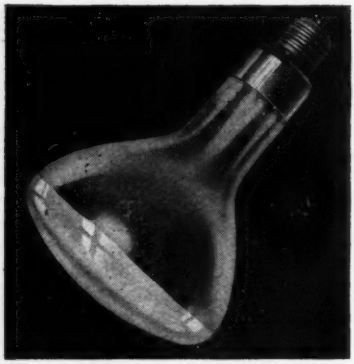
This book will be of interest to many in addition to those for whom it is intended, i.e., those concerned with the design and planning of stages in schools, colleges, community centres, village institutes, and other buildings in which it is necessary to provide multi-purpose assembly halls. There is for most people a certain glamour in what goes on behind the scenes of the theatre, large or small, and this book, though it does not deal with the theatre proper, gives in simple terms quite a lot of interesting information.

Only part of the book deals with lighting but might well be studied by any lighting engineer who is likely to be called upon to advise on the lighting for the annual pantomime in his village hall.

The glossary of technical theatrical terms is useful. The book is well illustrated, the line diagrams showing stage layout being particularly well done.

LIGHTING FITTINGS

A new 150 watt Osram lamp with internally silvered bulb introduced by THE GENERAL ELECTRIC CO., LTD., enables spotlighting effects to be obtained without an external reflector being necessary. The silvering inside the bulb, which concentrates the light in the direction in which the lamp is pointed, can be seen in the illustration. Shop lighting is a very suitable field of application for the lamp, which provides a convenient means of spotlighting individual features of a display both in windows and in interiors. It can be used most effectively in conjunction with general lighting by fluorescent lamps. The lamp has a wreath filament and E.S. cap, and is supplied for 110, 210, 230 and 250 volts.

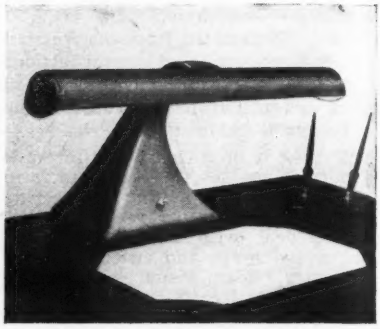


Osram 150w. Spotlight Reflector.

Following our editorial comment a short time ago on the apparent absence of fluorescent table or desk lamps we have since been informed of two such desk lamps.

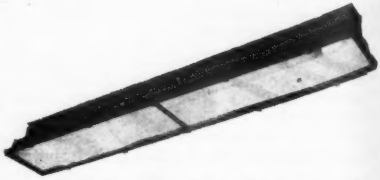
One is produced by P. W. ALLEN & Co. and has been designed for the desk of the executive. Made throughout in aluminium and finished in rough bronze stove enamel it is of pleasing appearance as shown in the illustration. Rigidity and stability are obtained by adequate weight and base area. A 2 ft. 20 watt white tube is used with control gear fitted in the base. The choke is tapped for the 200-250 volt range.

The other lamp is the "Solite" fluorescent desk lamp by MOUNTSPUN, LTD., which is of attractive design and is available in a variety of colour finishes. The lamp used is 11 in. long consuming 18 watts. The price of the lamp, complete with tube, is £5 12s. (purchase tax £1 7s.).



'Executive' fluorescent desk lamp.

BENJAMIN ELECTRIC announce the introduction of their Visor Covers for use with Flurolier Reflectors. The fitting of a Visor Cover encloses the reflector portion of the Flurolier and protects the lamps and reflecting surfaces from the direct deposit of dirt and dust. The Visor Covers are made up in special rolled steel frames divided into two panels by a central bar. Along one side of the frame a hinged metal strip is fitted equipped with a device for easily and quickly securing the Visor to the side of the reflector, no holes in the reflector being necessary. The cover is thereby hinged to the edge of the reflector and the free edge is fastened by simple hinged clips to the reflector bead. The metalwork is bonderised and sprayed to match the reflector. They are glazed either with clear glass or with clear acrylic plastic panels and fitted with a rubber gasket secured to the frame to ensure a close fit.



Benjamin Flurolier type 'F' fitted with Visor Cover.

Trade Literature

FERGUSON EDWARDS, LTD. — "Edlac Cromotonics." Booklet describing the Edlac system of scientific use of colour in factories and offices.

GEORGE FORREST & SON, LTD.—Details of cold cathode lighting fittings.

THE GLASS BUYERS GUIDE, 1949.—B.I.F. Issue. Published by the Du Mont Publishing Co., Ltd.

THE EDISON SWAN ELECTRIC CO., LTD.—List of fluorescent lamps, fittings and auxiliary gear, with prices.

THE WARDLE ENGINEERING CO., LTD.—Catalogue of industrial and commercial lighting equipment.

METROPOLITAN - VICKERS ELECTRICAL CO., LTD. — Catalogue of Metrovick fluorescent fittings.

THE PLESSEY CO., LTD.—Brochures describing range of motor start capacitors and electrolytic capacitors.

"FESTIVAL OF BRITAIN." The Council of Industrial Design have opened a 1951 stock list to which they invite manufacturers to send photographs or drawings of their best products. Address to Stock List, Council of Industrial Design, Tilbury House, Petty France, London, S.W.1.

Street Lighting

The illustration on the right shows the trial installation of Metrovick "S.O. Fifty" lanterns at Garratt-lane, Wandsworth. The lanterns, which are of moulded "Perspex," each house a 140-w. sodium lamp and are mounted at 25 ft. on existing trolley-bus poles.

The high brightness of both the road and the background formed by the footpath and houses will be noted.

Another sodium lighting installation is shown in the other illustration which is of Selvage-lane, Hendon, where 140-w. lamps in G.E.C. lanterns are used. Some 1,000 main and side road G.E.C. lanterns for use with 140-w. and 60-w. sodium lamps have been supplied to the Borough of Hendon. These lanterns are being used as part of a major scheme for the relighting of all through traffic routes and the more important side roads.

Above — Trial installation of Metrovick 'S.O. Fifty' lanterns at Wandsworth.

Left—Sodium lighting at Selvage Lane, Hendon.

The EDITOR Replies

We have been asked, what is the best way of lighting mirrors? Our querist complains that they are so often badly lighted, and that this is true especially of mirrors in hotel bedrooms. Of course, what is really meant is, how can we best light ourselves, or whatever other objects we wish to see mirrored? No one wants to see a mirror as such, and, strictly speaking, that is impossible anyway, however we light it, for the images by which we infer its presence are always those of things other than itself—things that the mirror "sees." So, if we want to see ourselves, e.g., while shaving, the best way to light a mirror is to do it with our own illuminated visage! And the trouble with many hotel bedrooms is that we are only allowed a reasonably well illuminated half-face as a light source. Non-glaring light sources on either side of, or surrounding, the mirror, and in the same plane with it (or a parallel plane behind it), are still uncommon in bedrooms and dressing-rooms, except in daylight in rooms where a dressing-table is arranged in front of the window.

Talking of lighting in hotel bedrooms, we recently stayed at what is described as one of the country's leading hotels. The lighting in the bedroom was from an ancient chandelier from which hung three 60w. bare lamps, supplemented by one bedside lamp. There was no light at all even in the vicinity of the wash basin, which was situated in a corner of the room well screened from the windows. There seems little excuse for such a state of affairs—presumably people have been shaving in these rooms for a good many years. Managements, however, seem to prefer showy lighting for their public rooms to reasonable lighting for what is, after all, one of the most important daily operations in the life of the average male.

We have heard some doubts voiced about the serviceability of some of the recently introduced louvred fittings for fluorescent lamps. It seems likely that the proper cleaning of "egg-crate" louvres will increase the time required for maintenance. But fittings louvred in this way are intended chiefly for the lighting of offices, public buildings, dwellings, and similar interiors, where the dirtying of fittings often (though not always) takes place less rapidly than in factory interiors.

In the case of "louverall" ceilings, which have been developed in the United States, the problem of maintenance is probably more serious. However, the advisability of "louverall lighting" is being called in question for other reasons, chiefly, it appears, from recent American articles, because it does not prevent the occurrence of glare or dazzle due to images of the light sources seen in polished articles, such as office machines, tops of desks, and so on.

No doubt some of our readers who are old enough to need glasses for reading indoors have noticed that they do not need to use their glasses for reading outdoors on bright days. This, of course, confutes the suggestion occasionally propagated that modern recommended levels of illumination for working interiors are excessive and ruinous to the sight. In the great spectacles "rush," since the "free-for-all" service became operative, there has been no clamour for tinted glasses to protect the eyes from "excessive" illumination in workplaces.

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